March 4, 2002

Mr. William B. Geer
Advanced Metal Etching, Inc.
801 Gerber Street
Ligonier, Indiana 46767

Dear Mr. Geer:

Re: Exempt Operation Status,
113-15250-00079

The application from Advanced Metal Etching, Inc., received on January 22, 2002 has been reviewed. Based on the data submitted and the provisions in 326 IAC 2-1.1-3, it has been determined that the following emission units used in photo-etching of metal parts/sheets for electronic and high-tech industries, located at 801 Gerber Street, Ligonier, Indiana 46767 are classified as exempt from air pollution permit requirements:

(a) One (1) natural gas-fired overhead heater, identified as C.U.1 with a maximum heat input capacity of 0.120 million British thermal units per hour (mmBtu/hr);

(b) One (1) natural gas-fired overhead heater, identified as C.U.2 with a maximum heat input capacity of 0.175 mmBtu/hr;

(c) Three (3) natural gas-fired overhead heater, identified as C.U.3, C.U.5 and C.U.6 each with a maximum heat input capacity of 0.105 mmBtu/hr;

(d) One (1) natural gas-fired overhead heater, identified as C.U.4 with a maximum heat input capacity of 0.20 mmBtu/hr;

(e) One (1) open top degreaser, identified as 001 with a maximum usage rate of 0.0332 gallon per hour;

(f) Cut metal sheets acid dipping operation, with a maximum usage rate of 0.57 gallon per hour;

(g) Exposed sheets developing with a maximum usage rate of 4.4 gallon per hour;

(h) Etching process with a maximum rated capacity of 8.5 gallons per hour;

(i) Caustic stripping of etched sheets for the removal of photo-resist laminate, with a maximum usage rate of 0.53 pounds per hour;

(j) Etched sheets acid dipping operation, with a maximum usage rate of 0.23 gallon per hour;

(k) Electrocleaning process, with a maximum usage rate of 0.1375 gallons per hour;

(l) Rinsing process using ammonium persulfate or sulfuric acid solution, with a maximum usage rate of 0.1375 gallons per hour; and

(m) Tin electroplating operation, capable of plating 22 sheets per hour.

The degreasing, etching, caustic stripping, etched metal sheets acid dipping, electrocleaning, rinsing and tin electroplating operations are controlled by a scrubber.

The following conditions shall be applicable:

(1) Pursuant to 326 IAC 5-1-2 (Opacity Limitations) except as provided in 326 IAC 5-1-3 (Temporary Exemptions), opacity shall meet the following:

(a) Opacity shall not exceed an average of forty percent (40%) in any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.

(b) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of 15 minutes (60 readings) in a 6-hour period as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuos opacity monitor in a six (6) hour period.

(2) Pursuant to 326 IAC 6-3 (Process Operations PM Limitation), PM emissions from Cut Metal Sheets Acid Dipping, Etching, Etched Sheets Acid Dipping, Rinsing and Tin Electroplating shall be limited using the following equation:

Interpolation and extrapolation of the data for the process weight rate up to sixty thousand (60,000) pounds per hour shall be accomplished by use of the equation:

$E = 4.10\ P^{0.67}$ where E = rate of emission in pounds per hour and
P = process weight rate in tons per hour

The scrubber shall be in operation at all times when any of these processes is in operation, in order to comply with this limit.

(3) Pursuant to 326 IAC 8-3-3 (Open Top Vapor Degreaser Operation), the owner or operator of the open top vapor degreaser, identified as 001 shall:

(a) equip the vapor degreaser with a cover that can be opened and closed easily without disturbing the vapor zone;
(b) keep the cover closed at all times except when processing work loads through the degreaser;
(c) minimize solvent carryout by:
  (A) racking parts to allow complete drainage;
  (B) moving parts in and out of the degreaser at less than 3.3 meters per minute (eleven (11) feet per minute);
  (C) degreasing the workload in the vapor zone at least thirty (30) seconds or until condensation ceases;
  (D) tipping out any pools of solvent on the cleaned parts before removal; and
  (E) allowing parts to dry within the degreaser for at least fifteen (15) seconds or until visually dry;
(d) not degrease porous or absorbent materials, such as cloth, leather, wood or rope;

(e) not occupy more than half of the degreaser's open top area with the workload;
(f) not load the degreaser such that the vapor level drops more than fifty percent (50%) of the vapor depth when the workload is removed;
(g) never spray above the vapor level;
(h) repair solvent leaks immediately, or shut down the degreaser;
(i) store waste solvent only in covered containers and not dispose of waste solvent or transfer it to another party, such that greater than twenty percent (20%) of the waste solvent (by weight) can evaporate into the atmosphere;
(j) not use workplace fans near the degreaser opening;
(k) not allow visually detectable water in the solvent exiting the water separator; and
(l) provide a permanent, conspicuous label summarizing the operating requirements.

(3) Any change or modification which may increase the potential Particulate Matter (PM) or PM10 to five (5) tons per year or more and Volatile Organic Compound (VOC) emissions to ten (10) tons per year or more from the equipment covered in this exemption must be approved by the Office of Air Quality (OAQ) before such change may occur.

(4) Any change or modification which may increase the potential to emit (PTE) of any single hazardous air pollutant (HAP) to 10 tons per year or any combination of HAPs to 25 tons per year or more from the equipment covered in this exemption must be approved by the Office of Air Quality (OAQ) before such change may occur.

This exemption is the first air approval issued to this source.

An application or notification shall be submitted in accordance with 326 IAC 2 to the Office of Air Quality (OAQ) if the source proposes to construct new emission units, modify existing emission units, or otherwise modify the source.

Sincerely,

Original signed by Paul Dubenetzky
Paul Dubenetzky, Chief
Permits Branch
Office of Air Quality

APD

cc: File - Noble County
Noble County Health Department
Air Compliance -Doyle Houser
Northern Regional Office
Permit Tracking - Janet Mobley
Technical Support and Modeling - Michele Boner
Compliance Data Section - Karen Nowak

Indiana Department of Environmental Management
Office of Air Quality

Technical Support Document (TSD) for an Exemption

Source Background and Description

Source Name:	Advanced Metal Etching, Inc.
Source Location:	801 Gerber Street, Ligonier, Indiana 46767
County:	Noble
SIC Code:	3479
Operation Permit No.:	113-15250-00079
Permit Reviewer:	Aida De Guzman

The Office of Air Quality (OAQ) has reviewed an application from Advanced Metal Etching, Inc. relating to the operation of the following emission units used in the photo-etching of metal parts/sheets for electronic and high-tech industries:

(a) One (1) natural gas-fired overhead heater, identified as C.U.1 with a maximum heat input capacity of 0.120 million British thermal units per hour (mmBtu/hr);

(b) One (1) natural gas-fired overhead heater, identified as C.U.2 with a maximum heat input capacity of 0.175 mmBtu/hr;

(c) Three (3) natural gas-fired overhead heater, identified as C.U.3, C.U.5 and C.U.6 each with a maximum heat input capacity of 0.105 mmBtu/hr;

(d) One (1) natural gas-fired overhead heater, identified as C.U.4 with a maximum heat input capacity of 0.20 mmBtu/hr;

(e) One (1) open top degreaser, identified as 001 with a maximum usage rate of 0.0332 gallon per hour;

(f) Cut metal sheets acid dipping operation, with a maximum usage rate of 0.57 gallon per hour;

(g) Exposed sheets developing with a maximum usage rate of 4.4 gallon per hour;

(h) Etching process with a maximum rated capacity of 8.5 gallons per hour;

(i) Caustic stripping of etched sheets for the removal of photo-resist laminate, with a maximum usage rate of 0.53 pounds per hour;

(j) Etched sheets acid dipping operation, with a maximum usage rate of 0.23 gallon per hour;

(k) Electrocleaning process, with a maximum usage rate of 0.1375 gallons per hour;

(l) Rinsing process using ammonium persulfate or sulfuric acid solution, with a maximum usage rate of 0.1375 gallons per hour; and

(m) Tin electroplating operation, capable of plating 22 sheets per hour.

The degreasing, etching, caustic stripping, etched metal sheets acid dipping, electrocleaning, rinsing and tin electroplating operations are controlled by a scrubber.

Stack Summary

Stack ID	Operation	Height (feet)	Diameter (feet)	Flow Rate (acfm)	Temperature (^{0}F)
1	Building overheat natural gas-fired heater	25	0.5	-	ambient
2	Process exhaust fume scrubber	25	1	3000	ambient
3	Building overheat natural gas-fired heater	25	0.5	-	ambient
4	Building overheat natural gas-fired heater	25	0.5	-	ambient
5	Building overheat natural gas-fired heater	25	0.5	-	ambient
6	Building overheat natural gas-fired heater	25	0.5	-	ambient
7	Building overheat natural gas-fired heater	25	0.5	-	ambient

Recommendation

The staff recommends to the Commissioner that the operation be approved. This recommendation is based on the following facts and conditions:

Unless otherwise stated, information used in this review was derived from the application and additional information submitted by the applicant.

An application for the purposes of this review was received on January 22, 2002, with additional information received on February 11, 2002 and February 18, 2001.

Emission Calculations

(a) Natural Gas-Fired Overhead Heaters: See Page 1 of 1 TSD Appendix A for detailed emission calculations.

(b) Photo-Etched Metal Parts Production:
The degreasing, caustic stripping, etching, etched metal sheets acid dipping, electrocleaning, rinsing and tin electroplating operations are controlled by a scrubber.

(1) Degreasing:

VOC/Glycol Ether emissions = 0.26 lb/hr * 20% glycol ether * 8760

hrs/yr * ton/2000 lb
= 0.23 tons/yr

(2) Cut Metal Sheets Acid Dipping:

HCl/PM/PM10 Emissions = 0.57 gal/hr * 10% HCl * 11 lb/gal * 8760 hrs/yr * ton/2000 lb
= 2.7 tons/yr

(3) Developing (Exposed Metal Sheets):
This process uses developing solution made up of sodium carbonate (soda ash) and water. Therefore, no VOC nor HAP is emitted from this process.

(4) Etching:
Ferric Chloride solution is sprayed on the laminated and developed metal sheets. Fumes are controlled by a scrubber.

HCl/PM/PM10 Emissions = 8.5 gal/hr * 0.5% HCl * 8.33 lb/gal * 8760 hrs/yr * ton/2000 lb
= 0.19 ton/yr (before control)

= 0.19 (1 - 0.90)
= 0.019 ton/yr (after control)

(5) Caustic Stripping:

VOC/Glycol Ether Emissions = 0.53 lbs/hr * 8760 hrs/yr * 20% glycol ether * ton/2000 lb
= 0.46 ton/yr

(6) Etched Sheets Acid Dipping:

HCl/PM/PM10 Emissions = 0.23 gal/hr * 10% HCl * 11 lb/gal * 8760 hrs/yr * ton/2000 lb
= 1.1 tons/yr (before control)

= 1.1 tons/yr (1 - 0.90)
= 0.11 ton/yr (after control)

(7) Electrocleaning:
There are no VOC nor HAP emitted from this process, because the solution being used is made up of potassium hydroxide, potassium pyrophosphate, sorbitol, potassium silicate and sodium hydroxide, which are not VOC nor HAP.

(6) Rinsing:
Using Ammonium Persulfate (dry form) or Sulfuric Acid. Using the worst case in the calculations the emission is as follows:

Sulfuric Acid/PM/PM10 Emissions = 0.1375 gallon/hr * 8% sulfuric acid * 8.88 lb/gal * 8760 hrs/yr * ton/2000 lb
= 0.43 ton/yr (before control)

= 0.43 ton/yr (1 - 0.90)
= 0.043 ton/yr (after control)

(9) Tin Electroplating:

Using equation 2 in Chapter 12.20-13 which estimates the controlled emissions from nonchromium plating tanks

Ef_m = $0.028 * EF_{Cr} * C_m$
= $0.028 * 4.4 \times 10^{-5}$ grains/dscf * 6.95 oz/gal
= 8.5×10^{-6} grains/dscf (Bright tin emission factor)

Ef_m = $0.028 * EF_{Cr} * C_m$
= $0.028 * 4.4 \times 10^{-5}$ grains/dscf * 17.1 oz/gal
= 2.1×10^{-5} grains/dscf (Matte tin emission factor)

Where:

EF_m = Emission factor for metal "m" , grains/dscf
EF_{Cr} = Emission factor for controlled hard chromium electroplating emissions, 4.4×10^{-5} grains/dscf
C_m = bath concentration for metal "m", 17.1 oz/gal & 6.95 oz/gal

Using the worst electroplating emission factor (2.1×10^{-5} grains/dscf):

PM/PM10 Emissions = 2.1×10^{-5} grains/dscf * 3,000 scfm * 60 min/hr * lb/7000 gr * 8760 hrs/yr * ton/2000 lb
= 0.0024 tons/yr (after control)

PM/PM10 Emissions = 0.0024 tons/yr /(1-0.97)
= 0.08 ton/yr (before control)

Potential To Emit

Pursuant to 326 IAC 2-1.1-1(16), Potential to Emit is defined as "the maximum capacity of a stationary source or emissions unit to emit any air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of a source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or type or amount of material combusted, stored, or processed shall be treated as part of its design if the limitation is enforceable by the U. S. EPA, the department, or the appropriate local air pollution control agency."

Pollutant	Potential To Emit (tons/year)
PM	4.5
PM-10	4.5
SO_2	0.0
VOC	0.69
CO	0.3
NO_x	0.4

HAP's	Potential To Emit (tons/year)
Hydrochloric Acid	3.99
Glycol Ether	0.69
Sulfuric Acid	0.43
TOTAL	5.11

Justification for the Permit Level

The existing source is exempted from the registration and permitting requirements, pursuant to 326 IAC 2-1.1-3, since the potential to emit Particulate matter (PM) is less than five (5) tons per year.

Actual Emissions

No previous emission data has been received from the source.

County Attainment Status

The source is located in Noble County.

Pollutant	Status
PM-10	attainment
SO_2	attainment
NO_2	attainment
Ozone	attainment
CO	attainment
Lead	not determined

(a) Volatile organic compounds (VOC) are precursors for the formation of ozone. Therefore, VOC emissions are considered when evaluating the rule applicability relating to the ozone standards. Noble County has been designated as attainment or unclassifiable for ozone. Therefore, VOC emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2 and 40 CFR 52.21.

(b) Noble County has been classified as attainment or unclassifiable for all the other criteria pollutants. Therefore, these emissions were reviewed pursuant to the requirements for Prevention of Significant Deterioration (PSD), 326 IAC 2-2 and 40 CFR 52.21.

Source Status

Existing Source PSD Definition (emissions after controls, based on 8,760 hours of operation per year at rated capacity):

Pollutant	Emissions (ton/yr)
PM	2.87
PM10	2.87
SO_2	0.0
VOC	0.69
CO	0.3
NO_x	0.4
Single HAP	3.99
Combination HAPs	5.11

(a) This existing source is **not** a major stationary source because no attainment regulated pollutant is emitted at a rate of 250 tons per year or more, and it is not in one of the 28 listed source categories.

Part 70 Permit Determination

326 IAC 2-7 (Part 70 Permit Program)

This existing source is not subject to the Part 70 Permit requirements because the potential to emit (PTE) of:

(a) each criteria pollutant is less than 100 tons per year,
(b) a single hazardous air pollutant (HAP) is less than 10 tons per year, and
(c) any combination of HAPs is less than 25 tons/year.

This is the first air approval issued to this source.

Federal Rule Applicability

(a) There are no New Source Performance Standards (NSPS)(326 IAC 12 and 40 CFR Part 60) applicable to this source.

(b) National Emission Standards for Hazardous Air Pollutants (NESHAPs)(326 IAC 14 and 40 CFR Part 63.

(1) 40 CFR Part 63.460, Subpart T - National Emission Standards for Halogenated Solvents Cleaning. The Open Top Degreaser, ID 001 is not subject to this NESHAP, as the solvent used for degreasing is not one of the halogenated solvent listed in the rule, nor is using any combination of these halogenated HAP solvents in a total concentration greater than 5 percent by weight as a cleaning and/or drying agent.

(2) 40 CFR Part 63.340, Subpart N - National Emission Standards for Chromium Emissions From Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks. This NSPS is not applicable to the Tin Electroplating process, as the name indicates, it is using Tin instead of Chromium.

(3) There are no other National Emission Standards for Hazardous Air Pollutants (NESHAPs)(326 IAC 14 and 40 CFR Part 63) applicable to this source.

State Rule Applicability - Entire Source

(a) 326 IAC 5-1 (Visible Emissions Limitations)
Pursuant to 326 IAC 5-1-2 (Opacity Limitations), except as provided in 326 IAC 5-1-3 (Temporary Exemptions), opacity shall meet the following, unless otherwise stated in this permit:

(1) Opacity shall not exceed an average of forty percent (40%) any one (1) six (6) minute averaging period as determined in 326 IAC 5-1-4.

(2) Opacity shall not exceed sixty percent (60%) for more than a cumulative total of fifteen (15) minutes (sixty (60) readings) as measured according to 40 CFR 60, Appendix A, Method 9 or fifteen (15) one (1) minute nonoverlapping integrated averages for a continuous opacity monitor) in a six (6) hour period.

State Rule Applicability - Individual Facilities

(a) 326 IAC 8-3-2, and 326 IAC 8-3-5 (Organic Solvent Degreasing Operations: Cold Cleaner Operation)
The open top degreaser, identified as 001 is not subject to 326 IAC 8-3-2 and 326 IAC 8-3-5, because it does not have an operating temperature below the boiling point of the

organic solvent being used, and therefore is not a cold cleaner degreaser.

(b) 326 IAC 8-3-3 (Open Top Vapor Degreaser Operation)
The open top degreaser, identified as 001 is subject to 326 IAC 8-3-3. The owner or operator of an open top vapor degreaser shall:

(1) equip the vapor degreaser with a cover that can be opened and closed easily without disturbing the vapor zone;
(2) keep the cover closed at all times except when processing work loads through the degreaser;
(3) minimize solvent carryout by:
  (A) racking parts to allow complete drainage;
  (B) moving parts in and out of the degreaser at less than 3.3 meters per minute (eleven (11) feet per minute);
  (C) degreasing the workload in the vapor zone at least thirty (30) seconds or until condensation ceases;
  (D) tipping out any pools of solvent on the cleaned parts before removal; and
  (E) allowing parts to dry within the degreaser for at least fifteen (15) seconds or until visually dry;
(4) not degrease porous or absorbent materials, such as cloth, leather, wood or rope;
(5) not occupy more than half of the degreaser's open top area with the workload;
(6) not load the degreaser such that the vapor level drops more than fifty percent (50%) of the vapor depth when the workload is removed;
(7) never spray above the vapor level;
(8) repair solvent leaks immediately, or shut down the degreaser;
(9) store waste solvent only in covered containers and not dispose of waste solvent or transfer it to another party, such that greater than twenty percent (20%) of the waste solvent (by weight) can evaporate into the atmosphere;
(10) not use workplace fans near the degreaser opening;
(11) not allow visually detectable water in the solvent exiting the water separator; and
(12) provide a permanent, conspicuous label summarizing the operating requirements.

(c) 326 IAC 8-3-4, and 326 IAC 8-3-7 (Organic Solvent Degreasing Operations: Conveyorized Degreasing Operation)
The open top degreaser, identified as 001 is not subject to 326 IAC 8-3-4 and 326 IAC 8-3-7, as it is not a conveyorized degreaser.

(d) 326 IAC 8-3-6 (Organic Solvent Degreasing Operations: Open Top Vapor Degreaser Operation and Control Requirements)
The open top vapor degreaser, identified as 001 is not subject to 326 IAC 8-3-6, because it has no air to solvent interface of one (1) square meter (ten and eight-tenths (10.8) square feet) or greater.

(e) 326 IAC 8 (Volatile Organic Sources)
There are no other rules in 326 IAC 8 that apply to these facilities, because they do not fit any process categories in the rules.

(f) 326 IAC 2-4.1-1 (New Sources Toxics Control Rule)
This rule does not apply to the source, because the source has been existing since 1994, which is prior to the rule applicability (July 27, 1997) and it is not a major source for HAPs.

(g) 326 IAC 6-3 (Process Operations PM Limitation)
This rule mandates a PM emissions limit for Cut Metal Sheets Acid Dipping, Etching, Etched Sheets Acid Dipping, Rinsing and Tin Electroplating using the following equation:

Interpolation and extrapolation of the data for the process weight rate up to sixty thousand (60,000) pounds per hour shall be accomplished by use of the equation:

$E = 4.10 P^{0.67}$ where E = rate of emission in pounds per hour and
P = process weight rate in tons per hour

The Cut Metal Sheets Acid Dipping, Etching, Etched Sheets Acid Dipping, Rinsing and Tin Electroplating operations are controlled by a scrubber.

The scrubber shall be in operation at all times when any of these processes is in operation, in order to comply with this limit.

(h) 326 IAC 6-2 (Indirect Heating Sources)
The various natural gas-fired overhead heaters are not subject to 326 IAC 6-2, because they are not sources of indirect heating.

Conclusion

The operation of this existing photo-etching of metal parts/sheets production used for electronic and high-tech industries shall be subject to the conditions of the attached **Exemption 113-15250-00079.**

Appendix A: Emissions Calculations
Natural Gas Combustion Only
MM BTU/HR <100
Small Industrial Boiler

Company Name: Advanced Metal Etching, Inc.
Address City IN Zip: 801 Gerber Street, Ligonier, IN 46767
Exemption: 113-15250
Plt ID: 113-00079
Reviewer: Aida De Guzman
Date Application Received: January 22, 2002

Heat Input Capacity MMBtu/hr	Potential Throughput MMCF/yr
0.8	7.1

	Pollutant					
	PM*	PM10*	SO2	NOx	VOC	CO
Emission Factor in lb/MMCF	1.9	7.6	0.6	100.0 **see below	5.5	84.0
Potential Emission in tons/yr	0.0	0.0	0.0	0.4	0.0	0.3

*PM emission factor is filterable PM only. PM10 emission factor is filterable and condensable PM10 combined.
**Emission Factors for NOx: Uncontrolled = 100, Low NOx Burner = 50, Low NOx Burners/Flue gas recirculation = 32

Methodology

All emission factors are based on normal firing.
MMBtu = 1,000,000 Btu
MMCF = 1,000,000 Cubic Feet of Gas

Potential Throughput (MMCF) = Heat Input Capacity (MMBtu/hr) x 8,760 hrs/yr x 1 MMCF/1,000 MMBtu
Emission Factors are from AP 42, Chapter 1.4, Tables 1.4-1, 1.4-2, 1.4-3, SCC #1-02-006-02, 1-01-006-02, 1-03-006-02, and 1-03-006-03 (SUPPLEMENT D 3/98)
Emission (tons/yr) = Throughput (MMCF/yr) x Emission Factor (lb/MMCF)/2,000 lb/ton
Note: Check the applicable rules and test methods for PM and PM10 when using the above emission factors to confirm that the correct factor is used (i.e., condensable included/not included).